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The Practical Aspects of Infertility*

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I have nothing new or original to tell you to-day on this subject of infertility. Rather than give a straightforward paper, in text-book fashion, I will tell you how I go about tackling the problem in the field.

When I am called in to assist with infertility in a herd, I like to get as complete a history as possible before commencing. From a good clinical picture, in many cases, I can form a tentative opinion as to the nature of the trouble, having three possibilities in mind:—

1. Is a venereal disease present, *i.e.*, one transmitted by the bull, excluding contagious abortion?
2. Is it a physiological condition?
3. Is the trouble due to a faulty bull?

VENEREAL DISEASE

When the condition is well advanced, diagnosis is fairly easy. In the early stages, however, when the disease has just been introduced, with one or a few cows returning to service, diagnosis may not be simple, especially if there are no discharges or they are very slight.

If I suspect a venereal disease, the causes of which are well known to you all, *e.g.*, trichomoniasis, *C. pyogenes* and other virus and bacterial infections, I examine the whole herd for pregnancy, evidence of metritis, cervicitis, etc., recording all my findings.

My method of examination for pregnancy is as follows: I insert a well lubricated arm, either the right or left, into the rectum slowly, heading straight for the uterus. I diagnose early pregnancy, over 35 days in the heifer and 46 days in the cow, with certainty, by picking up the uterine wall between the finger and thumb. If the animal is pregnant, the foetal membranes are felt to slip away while the uterus is still held. If this can be done immediately after insertion, much time can be saved. If the bowel has to be evacuated or the arm removed due to straining, on re-insertion of the arm the uterus will be found to be contracted and curled up, making examination more difficult. I usually confirm by the presence of a corpus luteum. If a fully developed corpus luteum is present in either ovary of a previously normal "cycling" cow on the 21st day, it is strong evidence of pregnancy. In empty cows the "feel" of the uterus is noted, and on withdrawing the arm the cervix is palpated for evidence of cervicitis, enlargement, induration and protrusion of the cervical folds. When the condition is an infection, I do not bother with the ovaries.

The herd is then divided into three: (*a*) Pregnant, (*b*) Doubtful, (*c*) Empty. Doubtfuls are re-examined at a later date.

I then proceed to examine all, or the majority at any rate, of the empty cows with the vaginascope, observing the walls of the vagina and the cervix.

In this type of infertility there is nearly always present a discharge of one type or another. It may be scanty in amount and adherent to the cervix, or copious, flowing back down the speculum. During oestrum, discharges are usually more copious than in the dioestral phase. As a routine, I examine several preparations there and then for the presence of trichomonads. (These organisms are most easily found in the discharge from a pregnant cow.)

Samples of the discharges are collected and swabs from a dozen or so are taken with the greatest care to ensure that the swab does not come in contact with the inner wall of the vaginascope. These are sent to the laboratory in the hope that the organism will be isolated. In view of the fact that laboratory reports are so often negative, I believe that some hitherto unrecognisable organisms or viruses are responsible.

If a good percentage of animals are discharging the same type of material and returning to service at regular or irregular intervals, it suggests a venereal disease. This suspicion is nearly always confirmed by going into the history of each animal thoroughly, a newly purchased cow or a maiden heifer, or perhaps those cows served only by one bull, if two or more are being used, being infected. The source of the trouble may be tracked down to a newly purchased animal or one purchased some time ago, which on entering the herd, showed a discharge. Similarly, a new bull may be the culprit.

When my examination of the cows is completed I turn to the bull or bulls. A collection of semen is taken in the usual way and note is made of any abnormalities on the penis as he mounts the cow, also whether he is a "lazy" server or otherwise. Two or more ejaculates are taken and his semen examined macroscopically and microscopically. In many of these outbreaks I find that the bull gives a bad sample, this being watery and of poor density. Why this should be so I cannot say. If trichomonads have not been found up to this stage a sheath washing is taken. About 8 oz. of normal saline in a 12 oz. bottle is heated to blood heat, syringed into the sheath with the ordinary Nielsen catheter and Higginson's syringe. When the sheath is full the catheter is removed, the orifice is held closed by the hand, and the solution is massaged along the sheath for a few minutes and then allowed to drain into a clean container. This is taken to the laboratory, centrifuged and examined for the presence of trichomonads. The animal's testicles are examined for induration and other evidence of disease.

TREATMENT: We are all familiar with the control of trichomoniasis, and as this is a true venereal disease, the treatment of all others is somewhat along the same lines. Breeding is suspended until all the animals have been treated, their uteri have returned to a normal healthy state and the discharges disappeared. I have used iodine irrigation at weekly intervals, two, three, or even four times, depending on the degree of infection in each individual case, with both good and bad results. To those animals which did not respond I gave 50 to 70 mg. of stilboestrol intramuscularly at intervals of four days, repeating two or three times, and I must say results are very encouraging. I instruct the stockman to flush out the vaginal passage once a week with a weak antiseptic solution, *e.g.*, 2 per cent. dettol, until recovery. If trichomoniasis is the cause, I will leave it to your own judgment what you do with the bull. If he is a very valuable animal, the best criterion as to whether he is still transmitting disease after prolonged rest and treatment is to let him cover three or four non-infected animals.

In other cases, the bull's sheath is syringed out weekly with an antiseptic solution such as 2 per cent. dettol or acriflavin emulsion, or pessaries may be inserted. This treatment is also recommended for trichomoniasis.

If breeding is commenced too soon the condition is prolonged. Artificial insemination is recommended, but is not always practicable. One should go cautiously when breeding is commenced again. The bull should be used, as in trichomoniasis, on a non-infected heifer or cow which is watched carefully and is examined per vagina a few days after service for discharge or vaginitis, and diagnosed for pregnancy in 21 days. If pregnant, carry on with one or two of the treated animals. Personally, I instruct the stockman how to syringe out the bull after each service.

In these outbreaks of venereal disease vaginitis of a granular type is very common and whether it has any significance is doubtful. It may be due to the irritation caused by the discharging material or to an alteration in the *p*H. It clears up, however, due either to the rest or more likely to the action of the other agents used in treating the metritis.

Corynebacterium toxoid is now being given a trial in the treatment of *C. pyogenes* infections.

In those cases where only one or two cows are reported as returning to service, and which on visual examination of the vagina show a slight discharge with cervicitis or metritis, I examine the discharges and take swabs as usual together with the examination of a number of other allegedly normal cows in the herd. One cannot just run into a shed full of cows, irrigate with iodine the few cows reported and leave the matter there. This may be the commencement of serious trouble later on, and if detected in the early stages it will be all the more easily controlled. In many of these cases, however, the metritis is due to streptococci, staphylococci, or *B. coli*, or it may be non-specific and clear up after treatment with little tendency to spread.

PHYSIOLOGICAL INFERTILITY

This type of infertility is much more common during the winter months and early spring, and the history may be something like this. The owner reports that his cows or heifers are not coming into heat. The number varies from individuals to 25 per cent. of animals in some herds, rarely 40 per cent. in the case of cows.

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It is a very exceptional farm where at least one or two cows are not coming into service when expected. In the case of heifers, the whole bunch or the majority may have failed to show oestrum. Some may have returned to an unsuccessful service months before, but it may be that one, two or more are returning every three weeks, the number again varying on different farms.

When I suspect physiological, functionless or featureless or glandular upset, or whatever you like to call it, I eliminate the possibility of infection by examining a number of normal cows as well as the subjects to be treated, both per rectum for evidence of metritis and cervicitis and per vagina for further evidence of infection.

Before making up my mind definitely as to the nature of the infertility, I take into consideration a number of animals, both healthy and unhealthy. Having satisfied myself that no pathogenic organisms are responsible, I proceed to make a thorough examination of the ovaries, bursae and fallopian tubes.

I am of the opinion that suboestrum (or silent heat) tops the list of causes of physiological infertility by a long way.

In a number of such cows under examination, the ovaries show corpora lutea of varying sizes, follicles of varying sizes or perhaps no palpable structures at all. In the latter case a mistake could easily be made in classifying such a cow as in anoestrus and administering P.M.S. with resulting multiple ovulation, the stage of the oestral cycle actually being a few days before oestrum up to a few days post-oestrum. When in doubt, it is wise to examine again in ten days or so. If it is a case of suboestrum, a corpus luteum will be present; if anoestrus, the ovaries will be the same size as on the previous examination.

Aetiological factors are hazy, and I will not dwell on them here.

As regards treatment, my results, after expression of the corpus luteum, vary considerably on different farms, suggesting different degrees of the condition. I would say 60 per cent. of cases treated show signs of heat within a week, some after a much longer period, with conception.

I would just like to give a word of warning when carrying out this operation. In the abattoir I expressed the corpus luteum in about 40 cows. In every case there was haemorrhage, varying from a cupful to half a gallon or more. I was in the happy position, however, that the animals were all slaughtered within a few hours. Of course I used quite a lot of pressure on some of these cases, and no doubt the greater the damage to the ovary the greater the haemorrhage.

In the field I have had no fatalities. I do not express anything but a fully developed corpus luteum and I use little pressure. I hold my thumb in the crater, left for a minute as a precaution against severe haemorrhage. If the corpus luteum does not pop out I leave it. Three days after the follicle has ruptured the corpus luteum is represented by a slight protuberance on the surface of the ovary. It increases in size reaching its greatest volume at the ninth or tenth day; after the fourteenth day it begins to regress and may be difficult to palpate on the eighteenth day.

Unless great care is taken in expressing the corpus luteum, the ovarian tissue may be damaged, with the formation of fibrous tissue, which can be detected at a subsequent examination. Adhesions between the ovary and the bursal wall may develop. Haematomas have been found attached to an ovary after expression of the corpus luteum.

Other methods of treatment of suboestrum include the administration of oestrogenic hormones, iodine irrigation, etc. I do not use stilboestrol, having little faith in it for this type of infertility.

Iodine irrigation may be useful and seems to give results in some cases. Whether its beneficial action is a local one or the result of nervous stimulation it is difficult to say. I sometimes think its good effects are due to its stimulatory action on some other gland in the body after absorption; perhaps the thyroid or adrenal.

I have successfully artificially inseminated a number of these "silent heating" cows. I examine the ovaries daily from about the sixteenth day (estimated) after the commencement of the cycle. The corpus luteum gradually disappears, the uterus becomes erect and turgid, and when I find a follicle developing I inseminate on alternate days until it ruptures, which occurs usually after the second insemination. There may be two or three follicles present, but one develops more quickly than the others and can be palpated as a very tense, thin-walled "blister" on the surface of the ovary a day before ovulation, rupturing very easily when handled. The approaching heat can be confirmed by examining the cervix for oestral discharge.

Anoestrum is mostly confined to heifers, the history being that they never come into heat. This is confirmed by examining a few in each group to be treated. There is little likelihood of mistaking this condition, the ovaries being of equal size, very small, smooth and oval in shape. If only one individual animal is being visited, it is necessary for the inexperienced at least, to make a further examination in seven or 14 days' time. This is especially so in the case of a middle-aged cow, her ovaries being larger than those of a heifer in anoestrum.

Treatment: 1,500 to 2,000 I.U. of P.M.S. intramuscularly or intravenously is the only method at present. Here again results vary on different farms, probably due to different methods of husbandry. Best results are obtained in herds under good management. The indiscriminate use of this drug has brought it into disrepute. One cannot expect heifers in poor condition and on a low level of nutrition to reproduce young by an injection of P.M.S.

Now to the next condition under this heading, where the history is that several cows, occasionally one, are returning to service every three weeks. Pathogenic organisms being ruled out, I proceed to make a very detailed examination of all the reproductive organs. In most cases the cause is a mystery. I would just like to add here those causes which are not physiological such as severe adhesions of the bursae, salpingitis, preventing passage of the ova down the duct, adhesions in the cervix, injuries anywhere along the tract preventing the spermatozoa descending into the uterus, etc.

I have examined a number of these clinically normal cows on the day of heat and on the following three consecutive days.

In some the follicle could be palpated on the second day and even the third day after the cessation of heat. On the day of heat I found the follicle tense, as if ripe and ready to ovulate; the following day, however, it was not so tense the wall becoming slacker, but still containing fluid. A day later it had shrunk down to the level of the ovary and gave the impression that regression was taking place. In other instances ovulation was delayed. These were isolated cases and the question of manganese deficiency was not gone into. It is unlikely, however, that manganese deficiency is responsible for causing delayed ovulation in one animal in a herd.

It would appear that luteinising hormone is indicated here, in view of the fact that it gives good results in mares with prolonged oestral periods.

Until more is known concerning the aetiology, Lugol's will continue to be pumped in. At Cambridge, Day and Laing report good results by irrigating 24 hours following service. Expression of the corpus luteum here again gives fair results. It is difficult to explain, but it seems to have a "trigger" action.

Cystic Ovaries

An empty cow, not on heat, showing a swollen vulva, relaxed ligaments or an elevated tail at the root is almost certain to have cystic ovaries. Going through a herd of cows and seeing any showing these symptoms, on rectal examination you will find this to be correct.

Cystic ovaries are much more frequent than is realised. Many cows, shortly after calving, develop them, and as a matter of interest a number have been examined at weekly intervals, having been picked out in the first instance by the appearance of the external genitalia, some showing only a slightly swollen vulva and nothing more. It was found that after an interval of a few months or less the ovaries become normal again, the external symptoms disappearing. The cyst wall in these cases is rather delicate, easily ruptured and usually the size of a golf ball.

Cysts may be classified according to their shape and size into the following: (*a*) Thumbnail or marble size, (*b*) Half this size say, a little larger than a pea, (*c*) Golf ball, or even lemon size. A further grouping may be made with those showing adhesions, *i.e.*, cystic ovaries with adhesions.

In the thumbnail size cyst, the line of demarcation between it and the ovary is indistinct. It can be detected, however, by fluctuation on pressure. There is usually only one cyst, with one ovary only involved, the other being normal. In order to confirm that this is a true cyst and not a follicle, it is necessary to make a further examination in a week or so, when it will still be present. This type is troublesome. It keeps recurring after repeated rupturing, but many cases eventually become normal. Luteinising hormone is worth a trial and should be injected following rupture. Owing to its high cost, however, it is uneconomic.

In the smaller size, one or both ovaries may be involved. The cysts are usually multiple and feel like little elevations on the surface. The cow is usually bulling at intervals of a few days, that is every time another cyst is developing. Most of these animals mount other cows but refuse to stand to the bull. By rupturing the cysts, if possible at frequent intervals, some animals may be made to return to normal. The worst type are those that are deeply embedded, with fibrous tissue developing around them and causing an enlargement of the ovary.

Best results have been obtained in those which are the size of a golf ball or more, by repeated rupturing. Frequently both ovaries are involved and may contain one or two cysts. If the cyst wall is very tough and will not rupture on manipulation, this may be brought about by holding the ovary in the left hand within the rectum and puncturing with a long hypodermic needle through the

vagina. Otherwise, if left for a week or so, it usually ruptures quite easily. Recurrence takes place in some cases, but by perseverance recovery will, in the majority of cases, ensue.

Cystic Ovaries with Adhesions

When both ovaries are involved, the cow can go to the slaughterhouse. This is one of the few cases found in sterility work where a definite prognosis can be given. If only one ovary is involved and the other normal, the animal will not breed owing to the influence of the cystic secretion over the other ovary. Ovariotomy of the diseased ovary is indicated.

Adhesions of the Ovarian Bursae

We are all indebted to Rowson for his work on this condition, and I will give you my views in a few words. The condition is not frequently encountered. I do not make a practice of examining the bursae as a routine, except in those cases where everything else appears normal. Personally, I find very few cases in the field, but during the examination of 100 cows in the abattoir, *ante-mortem* and *post-mortem*, I found roughly 25 per cent. had adhesions of varying degrees. These were of course, old cows disposed of on account of breeding trouble, mastitis, etc., etc.

Examination for this condition takes quite a little time. If the rectum is ballooned or the animal is straining, it should not be attempted. Agan, we cannot say what degree of adhesion will prevent the passage of the ova down the tube. One can only give a guarded prognosis and follow up the case. If the condition is bi-lateral and extensive and no other cause of failure to breed can be found, it may be assumed to be due to this cause. Salpingitis is very difficult to diagnose, except where the fallopian tube is very much thickened. The degree and whether both sides are involved are the deciding factors.

I believe the presence of adhesions in many cows is a "physiological hazard." My reason for this belief is that in many of those animals in which I expressed the corpus luteum in the abattoir and which were killed within a few hours, strands of fibrin resulting from the haemorrhage, stretched across from the ovary to the wall of the bursa. I have no doubt that if these animals had not been slaughtered these fibrin threads would have become organised, resulting in adhesions. We know that the corpus luteum regresses and there is no haemorrhage, but there is a slight amount from a ruptured follicle. Perhaps I should not say a slight amount, as the quantity is unknown.

Infertility Due to a Faulty Bull

If the history is such that the cows are returning to a particular bull and there is no evidence of disease, the trouble is due either to mass physiological infertility or more likely to a sterile bull. An examination of the bull's semen will verify this in most cases.

When a number of cows are returning, but a percentage are in calf to him, one hesitates to incriminate the bull. As usual, the herd will be diagnosed for pregnancy and breeding records gone into. If his semen sample is a poor one, then there is no doubt as to the cause of the trouble. It is very difficult sometimes to say just how fertile a bull is on examination of a sample of semen, there being many degrees between fertility and absolute sterility. When a doubt exists I pay more attention to the history than to the semen picture. The best criterion as to his fertility where inadequate records are kept is to let him cover a number of selected cows or heifers.

Mr. Spriggs has found two bulls which gave a perfect sample of semen but were completely sterile.

The Examination of Bulls for Infertility

When examining a bull for infertility, one must bear in mind that he should not be condemned on one or two bad samples of his semen taken successively.

The first ejaculate, especially if he has not been in use for a few days, may contain many dead and abnormal sperms. These have been accumulating in the epididymis where they undergo early degeneration. Furthermore, a bull may give a fair sample to-day and the opposite to-morrow, perhaps good one week and the reverse the next.

It is essential that he thrusts well into the artificial vagina, otherwise the collection may consist mainly of seminal fluid and few sperms.

The colour of the semen should be milky-white with a marbling effect, caused by the moving sperms in suspension. The volume in young bulls is 1 to 2 c.c. and in old ones 5 to 8 c.c. A very deep, yellowish colour denotes the presence of pus cells.

The *p*H of a good sample is between 6·5 and 7·2. The more acid the sample the greater the density, the higher the activity and the greater the motility. An alkali reaction is an indication of a poor sample; the higher the *p*H the lower the concentration and the weaker the activity.

A drop of semen on a slide under the two-thirds objective should show a "wave-like" movement in contra-distinction to a mass of wriggling sperm of poor density. A good sample should give a count of from 300,000 to 1,000,000 spermatozoa per c.mm. The abnormals should not be more than 15 per cent.; these consist of sperms with double heads, double tails, protoplasmic attachments to the body, bent and twisted tails.

Occasionally a very good stock-getter will become "lazy" and take hours to serve a cow; perhaps he will take no interest in her whatever. The cause is unknown in many cases. In young bulls it may be due to overwork; in the old animal to under-use, usually associated with overfeeding and little exercise. The treatment in both cases is rest from work for the young animal and "change of scene" for the older; in other words, they should both be put to pasture or given other exercise, from which many will return to normality more vigorous than ever.

Occasionally, young bulls, on entering herds, appear to be useless. In some, the penis extrudes only a few inches, others do not ejaculate or the semen contains no live sperm. In the absence of anatomical conditions which can be treated surgically, these animals should be given a chance to improve by the postponement of sexual work. Many, as a result, attain fertility of their own accord.

Various hormones, ascorbic acid, etc., are under trial in treating such cases. 3,000 to 6,000 I.U. of P.M.S. at weekly intervals for a few weeks seem to give good results in some young bulls. In the more mature animal which has "gone off" it at least gives a temporary improvement.

Discussion

The discussion which followed brought out some very interesting points. Mr. J. Bowett enquired if Mr. Davison could explain why so many maiden mares had failed to come in oestrus this year. The possible explanation given by Mr. Davison was that the drought, poor grass and late spring might have prolonged the anoestrus period. He said further that this was the case in animals in poor condition and pointed out that the ovaries showed either very small follicles or none at all. The speaker explained that mares sometimes showed all the physiological changes of oestrus in the vagina and cervix, the animals ovulated regularly but they failed to show the external manifestations of heat. "Silent heating" mares could be detected by examining the vagina with the speculum, when it would be noticed that the cervix was relaxed and showed a moist appearance. A large ripe follicle would be found in either ovary. In such cases the mares could be held by a twitch to the horse when many could be covered successfully.

Mr. H. S. Cockburn asked if the measurement of the respiratory rate was the best method of evaluating semen. Mr. Davison replied that the Barcroft apparatus was the instrument used for this purpose, but he said it was not suitable for field work. Experiments by Dr. Walton were still in progress.

Mr. George Eaton expressed his great appreciation of the help he had received from Mr. Davison. This sentiment was received cordially by other members. Mr. Eaton had mastered Mr. Davison's technique of insertion of the catheter into the uterus without the use of vulsellum forceps. This method was very useful in dealing with small animals and it removed a potent cause of further injury to inflamed parts. Time was also saved.

Mr. E. Clark enquired the *p*H of the normal vagina. He had often seen mares douched with sod. bicarb. solution and served successfully immediately afterwards. Mr. Davison replied that the normal reaction in the cow was slightly on the alkaline side, 7 to 7·5. In the mare it was slightly lower, but it varied in both animals during the cycle. It was once thought that vaginitis was the most important cause of infertility and the acidity thus produced was neutralised by the sod. bicarb. solution, and so conception was thus promoted. Warm bicarbonate solution possibly produced its effect, he continued, firstly by its warmth increasing the natural symptoms of "heat" and relaxation of the cervix. In the second place, it made the mucus more fluid owing to its alkalinity, thus allowing a greater number of spermatozoa to swim along the cervical canal. Mr. Davison explained also that the semen of a fully fertile bull was more acid than any secretion of the vagina.

Mr. Benbow mentioned the occurrence of a sterile discharge from cows after service. In these cases pregnancy had resulted although irrigation had been carried out two days after service. Mr. Davison remarked that he had encountered similar discharges in poor heifers and he attributed the success of the service to the stimulatory character of the treatment on the endometrium.

Mr. Bowett had also mentioned a case of a first calf heifer which had been to a service two days prior to irrigation and Mr. Davison observed that it was known that the ovum did not arrive in the uterus for three days or longer. In both the cases mentioned, therefore, the ovum was safely sheltered until the uterus was free from foreign substances.

Mr. Wilkinson raised the point of the efficacy of douching of the prepuce of the bull in trichomoniasis. Mr. Davison's answer was that it was only of service as a precautionary measure. In any case the douching he had spoken of in his talk was a modification purely intended for the purpose of diagnosis.

Mr. Auchterlonie wanted to know if there was any information to show that deficiency of vitamin A explained the absence of oestrus in so many animals early this year due to low diet. Mr. Davison thought it was unlikely that there was deficiency of vitamin A in the variety of foods in this country.

A bottle of milk was shown to the meeting which came from a 3½-year-old maiden barren Jersey heifer in which Mr. Davison had implanted 4,000 mg. diethylstilboestrol. The heifer had come in oestrus six days after the operation and had given ½ gallon of milk 12 days after the operation.

Mr. Davison subsequently gave a demonstration of artificial insemination on a cow.

Britain is now producing 70 per cent. of the food she consumes, says Mr. Leo T. Crowley, Foreign Economic Administrator at Washington, with reference to Lend-Lease food shipments for the first five months of the year. Of the remaining 30 per cent., she gets 10 per cent. from the U.S., and 20 per cent. from the Dominions and Colonies and other friendly countries.—*Reuter.*

Veterinary Services in the Dominions and Colonies*

H. A. REID, O.B.E., F.R.C.V.S., F.R.S.E., D.V.H.

When our enterprising Secretary first extended to me the privilege of addressing this meeting the suggestion was that I should speak only on New Zealand affairs. Now, however, the discussion which I am asked to open embraces other Dominions and the Colonies. This far more comprehensive field places the subject rather beyond my capacity because I have practical knowledge of only two of the British Dominions—Australia and New Zealand. Australia I have visited from time to time and I have spent a good many years in New Zealand. Under these circumstances I must therefore look to others to enlighten the meeting with regard to veterinary developments in such countries as Canada, the Union of South Africa and the Colonies. It is much to be regretted that one or two members and guests upon whom we had relied to carry the discussion into what to me is *terra incognita* are not able to be present.

Nearly all progressive movements tend to centre around the dynamic personality of certain individuals who with vision and enterprise act as pioneers and who, so to speak, blaze the trail. In Australia, for instance, I would certainly include in that distinguished company W. Tyson Kendall, M.R.C.V.S. Kendall went out to Australia in 1880 and made his home in Victoria. In those days veterinary surgery might perhaps have been termed an art—it was far from being a science. There was in fact little scope for high grade veterinary practice in a country which by reason of its isolation remained immune from epizootic diseases and also to a large extent from ordinary sporadic ailments. The present important dairy and fat stock industries were awaiting development and the only animals of value were race-horses and some of the heavier breeds used for haulage. In those days ordinary hacks could be bought from 10s. to £1. With little to encourage him in the enterprise Kendall founded the first Veterinary College in Melbourne in 1888 and continued for twenty years to provide Victoria and other Australian States with veterinary practitioners trained on approved scientific principles. The names of Cameron, who became Chief Veterinarian of Victoria, and Stewart and Max Henry, both of New South Wales, are also closely linked with the evolution of veterinary affairs in Australia. It may be recalled that in recognition of services rendered to the profession the Council honoured Professor Stewart in 1936 by electing him a Fellow of the Royal College of Veterinary Surgeons.

In 1908, under the aegis of Melbourne University, a State Veterinary College replaced Kendall's private establishment and J. A. Gilruth was appointed Principal. Dr. Kendall also joined the staff as lecturer in Veterinary Medicine. Gilruth's resignation was followed by the appointment of H. A. Woodruff who some of us remember at the Royal Veterinary College where, as a junior professor, he was held in high esteem. Later a Veterinary College in connection with Sydney University was founded with J. D. Stewart, F.R.C.V.S., as Principal.

Mention of Gilruth immediately turns one's thoughts in the direction of New Zealand where his name will always be associated with veterinary affairs. Before Gilruth's appointment as Chief Veterinarian in 1893 much the same conditions prevailed in New Zealand. Here again the country's freedom from disease depended upon its isolation although, as Gilruth soon discovered, there existed plenty of material to occupy his attention. Up to that time qualified veterinary practitioners were almost non-existent and animal health was regarded as of little significance. In 1898 Gilruth was joined by C. J. Reakes, M.R.C.V.S., and together they set out to organise a veterinary service for New Zealand. Gilruth's career proves that he possessed remarkable qualities, for he became successively Chief Veterinary Officer of New Zealand, Principal of the Melbourne Veterinary School, Administrator of the Northern Territory of Australia and finally Director of Animal Health of the Commonwealth Council of Scientific and Industrial Research. His colleague, Reakes, also achieved the distinction of ultimately becoming the first Director-General of the New Zealand Department of Agriculture. Gilruth, who attended the Pasteur Institute, Paris, for post-graduate training, also fulfilled the functions of pathologist to the New Zealand Department of Public Health and for some years carried out these onerous duties in conjunction with his veterinary activities.

After struggling along as best he could in premises which can only be described as primitive, Gilruth contrived to have a laboratory established at Wallaceville, nineteen miles from Wellington, where suitable conditions existed for carrying on research. After Gilruth's resignation in 1908 I was appointed Officer-in-Charge of this laboratory to be followed in 1924, when I resigned, by C. S. Hopkirk, D.V.Sc. (Melb.), who continues to hold this appointment. In 1939 a new and completely up-to-date laboratory adjoining the older premises was erected and there are also one or two subsidiary research stations in different parts of the country. Veterinary research has passed to the control of the Council of Scientific and Industrial Research and Dr. J. F. Filmer, well known for his investigations into diseases dependent upon mineral deficiencies, holds the appointment of Director. The former Veterinary Laboratory is now known as the Animal Research Station.

Since the investigation of disease can only be satisfactorily undertaken by a team of experts specialising in their own particular technique, the Research Station includes departments of biochemistry, dairy bacteriology and nutritional research—as well, of course, as veterinary pathology, bacteriology and parasitology. I should perhaps add that all laboratory services are free to veterinary surgeons or, for that matter, to anyone needing assistance of this kind.

The passing of the Slaughtering and Inspection Act in 1900 must be regarded as epoch-making in the history of veterinary developments in New Zealand. This important measure brought the whole of the hygienic aspect of the meat industry under veterinary control thereby ensuring the wholesomeness of meat and meat products whether consumed in New Zealand or prepared for export overseas. In order to implement the provisions of the Act a number of veterinary surgeons had to be recruited from Great Britain and these formed the nucleus of what has since grown into one of the most efficient veterinary services in the Empire. The Slaughtering and Inspection Act and its Regulations are administered by the Livestock Division of the Department of Agriculture under its present Director, Mr. W. C. Barry, M.R.C.V.S.

Soon after his appointment as Director-General of the Department, Reakes divided the country arbitrarily for purposes of veterinary administration into four areas each under the control of a Veterinary Superintendent with a staff of veterinary surgeons and lay stock inspectors. Although possessing no academic qualification the latter were trained and experienced men capable of rendering very able assistance in the control of animal disease and in the administration of the various provisions of the Stock Act, etc.

Not until 1926 was the Veterinary Surgeons Act passed which gives to all duly qualified veterinary surgeons registered in the Dominion a legal status equivalent to that accorded to the profession in other parts of the world.

The Stock Remedies Act of 1934 marks another milestone of progress in New Zealand's veterinary affairs. Under this enactment proprietary remedies can only be registered for sale provided they meet with the approval of a Board composed of veterinarians and pharmacists. The Board are also given powers to restrict or suppress exaggerated claims appearing in advertisements of the remedy.

A Veterinary Association, for membership of which all registered members of the profession are eligible, has been formed. Annual general meetings are held at which papers are presented and discussed and progress in certain aspects of research explained. The New Zealand Association has now been affiliated with the National Association of the Home Country.

To encourage more New Zealanders of suitable type to enter the profession the Government has within the past few years instituted scholarships to the value of £100 per annum, thus enabling selected candidates to undertake the necessary curriculum either at Sydney University or at one or other of the veterinary colleges in Great Britain. On graduating the beneficiaries are under an obligation to enter the service of the New Zealand Government and to remain in it for at least five years.

More recently still to ensure the availability of practitioners so-called Veterinary Clubs have been formed in certain districts and a veterinary surgeon practising under these conditions receives a graduated income as well as other assistance guaranteed by the farmers of the locality.

I feel that this brief and totally inadequate survey of veterinary developments in the countries with which I am more or less familiar is all that time permits me to say on the subject. It will, I hope, at least encourage further discussion.

* Presented to the annual general meeting of the Sussex Division, N.V.M.A., at Haywards Heath, June 23rd, 1944.

Under Section 5 of the Agriculture (Miscellaneous Provisions) Act, 1944, grants not exceeding 50 per cent. of the cost of installing piped water supplies to farmhouses and cottages occupied by farm workers by an extension from a new or existing farm water supply system are now payable. These arrangements are supplementary to the Government plans for extending public mains for domestic purposes in rural areas which are to be carried out after the war as part of the reconstruction programme, and are designed to assist in giving a domestic supply on farms in isolated districts that are unlikely to obtain a public supply.

CLINICAL COMMUNICATION

Torsion of the Stomach in a Bitch

G. E. LATIMER, B.SC., M.R.C.V.S.
Brierfield, Lancs.

Subject.—A 12-year-old Dalmatian bitch.

History.—About three hours previously, following a meal, the bitch was seen to strain and attempt unsuccessfully to vomit. Her abdomen became rapidly very enlarged and she showed signs of distress, becoming uneasy, breathing quickly and retching.

Clinical Signs.—The bitch was fairly bright and quite able to walk about, but tended to sit back on her haunches. The abdomen was enormously distended and percussion elicited a tympanitic sound. Auscultation revealed a resonant sound as of a small amount of fluid in a large space. Palpation showed the abdomen to be tense and with no signs of rupture or haematoma.

The respirations were shallow and rapid. The pulse very weak and the temperature 100° F. The mucous membranes were slightly cyanotic. There was fairly profuse salivation.

Diagnosis.—A diagnosis of torsion of the stomach was given in view of the fact that I had seen three similar cases at the Royal (Dick) Veterinary College about two years ago.

Prognosis.—Grave. The owner stated that he had had another Dalmatian which had died eight hours after showing similar symptoms.

Advice.—Destruction was advised, operation being deemed too risky.

Post-mortem Examination.—On opening the abdomen the greatly distended stomach forced its way out. The surface showed intense venous congestion. The stomach was twisted in such a way that the pylorus had passed ventrally and to the left, the duodenum running from left to right ventral to the oesophagus, the terminal part of which was completely occluded by being spirally twisted in an anti-clockwise direction (*i.e.*, looking from the head caudally). The twist was through about 200°. The fundus occupied most of the abdominal cavity.

When the stomach was rotated back into its normal position gentle pressure resulted in the ejection of a considerable amount of undigested and partly digested food from the mouth.

DOGS AS MINE "POINTERS"

"It is now possible to tell something of the story of mine detection by other than mechanical means, a method whereby animals help men to fight the war," says *The Times* in its issue of August 9th, and continues: "The processes of mine detection by mechanical means by soldiers in the field are many, lengthy, laborious, and often dangerous. It was in the constant search for an improved method that the use of dogs was developed. After much experiment it was found that dogs could quicken the process and lessen the risk of casualties among the men, at the same time with negligible risk of injury to themselves. They have the great advantage of being lighter than men, and can therefore move about among mines without the same danger of setting them off. All kinds of medium sized dogs of most breeds, and those of no recognisable breed—the 'Heinz hounds' are used for this work, being lent to the Army by their owners. It is the dog's sensitive sense of smell which enables him to find mines buried in the ground.

"The primary principle in training, on which is based all dog training, is used; it is only necessary for the dog to know what his master wants him to find and he will find it. He is taught then to indicate to his master as soon as he has found the mine. He does this by 'freezing' as a pointer does when he marks a bird. In this instance the training proceeds by easy stages, starting as a sort of game between the dog and the man, for it is impossible to make the dog find a mine unless to begin with he wishes to find it. A combination of his wish to please the man and the fact that a small reward—a titbit— is also involved begins the process. The men chosen to train these dogs have had long experience with dogs and possess the infinite patience and understanding of them without which they could achieve nothing.

"Men of the veterinary and remount service are responsible not only for the health of the dogs, but for preliminary tests to discover their aptitude. The field units who go into operational theatres for the actual work in the battlefield include officers and men of the Royal Army Veterinary Corps. Each dog travels with his own kennel, drinking bowl, feeding bowl, and cleaning kit, and is seldom parted from his own master for more than an hour or so."

* * * * *

Weekly Wisdom

The sign of a dying art is a high degree of technical skill coupled with a lack of original thought.—Anon.

REPORT

[A Report on Artificial Insemination in the United States submitted to the Agricultural Improvement Council. Edwards, J., and Ritchie, J. N. (1944.) pp. 19. (*Not on Sale to the Public.*).]

In 1943 the authors of this report visited various artificial insemination centres in the United States, and also contacted several laboratories where research work in this subject is being actively pursued. The principal aims of the visit were a study of types of A.I. organisations, an attempt to assess factors making for success or failure in organisation, and an investigation of the effect of A.I. on livestock improvement. New techniques, development in research, breeding experiments, the attitude of breed societies and methods of disease control as affecting A.I. were also noted.

Development of A.I. in the United States.—Growth of artificial breeding has been rapid; the first A.I. society was formed in 1937 and in March, 1943, there were 99 societies, exclusive of affiliated sub-units. At this latter date there were in A.I. societies 182,524 cows and 574 bulls. A feature of comparative interest is that in five years A.I. societies have come to provide breeding service for four times as many cows as the 35-years-old Bull Association movement. (The latter is roughly the American equivalent of our Premium Bull scheme.)

Types of Societies.—The great majority of A.I. organisations are of the farmer co-operative type. They are either organised separately as such or, as appears to be increasingly common, they may form part of an existing co-operative, usually a farmers' creamery. The reason for this latter development is interesting; creameries realise that the more milk they collect in a given area the lower will be their haulage costs. Higher yields per cow can be effected by better breeding and so an A.I. service is sponsored. One advantage is that an office staff to deal with records and finance is already in existence and insemination charges may be deducted from the member's milk cheque. Another is that capital for a start with good bulls and buildings is usually available.

The "Cornell" Organisation.—This is an example of the large type of A.I. society. A farmers' co-operative owns 30 bulls (18 Friesian and 12 Guernsey) and sells semen to 33 self-controlled inseminating units. Some of these units are close to the bull-centre, but others are up to 200 miles distant. Each unit has its own committee of management and engages its own inseminator.

"Local" Co-operatives.—The great majority of co-operative societies are of the "local" type—covering an area of up to 20 miles in radius from the centre and inseminating 3,000 to 6,000 cows per year.

The authors were unable to draw conclusions about the ideal size of an A.I. organisation, and those in the United States who have been thinking longest about it do not yet seem to have reached a decision. Theoretically the very large type ought to be most profitable, and yet of the two societies which have tried to copy the efficiently run Cornell model, one has gone bankrupt and the other has recently gone through a process of drastic financial reorganisation.

The service given by the "local" type of co-operative is undoubtedly more personal. Members call frequently to see the bulls; and if two lines of breeding within a breed are kept they make their choice of a line. No choice can be made in the Cornell organisation and because of the fixed semen-collection routine it is possible for a farmer with 15 cows to have each in-calf to a different sire. This is not a criticism if all the bulls are good, but some members complain that because of a lack of uniformity of type in the bulls, they are getting not a herd but a "collection."

Finance.—A.I. has developed in the U.S. without the aids of grants or subsidies. At every society visited, however, there was evidence of outside assistance, the money value of which it was difficult to estimate. In several cases societies were receiving a regular supply of bulls on hire at purely nominal rates from the U.S. Government herds at Beltsville, from the State University herds in which long-term breeding experiments were in progress and even from philanthropic breeders.

Cattle Bred by A.I.—There appears to be very general satisfaction with the improvement in type and production that is being effected. Areas in which A.I. first started already have a reputation for producing well-bred stock.

The interest in breeding and records which A.I. has awakened among commercial dairy farmers is causing a phenomenal demand for publications on calf-rearing, young stock management and feeding for milk production. The milk-recording movement is also affected; in Langlade County, Wisconsin, there was no recording when, five years ago, the first A.I. society was started; to-day 15% of the cows in the county are tested.

Organisation

Management.—While the possession of good bulls and the maintenance of a high conception rate are undoubtedly important, the evidence suggests that the need of sound business management comes first. A good treasurer, a good office system and insistence on prompt payment of charges or pre-payment on contract for inseminations appear to be common to all successful societies.

Personnel.—Societies with considerable experience find that it is impossible to predict the results which a new inseminator (lay or veterinary) will obtain "in the field." For this reason new men are supervised for the first two to four weeks and are judged thereafter by their monthly conception rates. Those who fail to get 50% of their cows in-calf in first inseminations are discharged. Even among those retained, conception rates may vary between 50 and 80% in spite of the fact that the same semen is being used.

Bulls.—At all centres visited a proportion of the bulls in use were young and unproved. Experience has shown that it will not do to rely exclusively on the older proved bulls. Yet in spite of this it is still possible to breed relatively more cows to the proved bulls by diluting their semen more extensively and by resting them before the approach of the heavy breeding season; when this arrives they are used intensively. Successful management of the bulls consists not only in good stockmanship but also in making a study of the rate at which each bull is capable of producing semen and arranging collection routines accordingly. In successful societies the régime is strict; in others trouble has been caused through failure to persevere with the slower or the older bull and the overworking of the younger or keener bull.

Techniques

Collection of Semen.—The standard type of artificial vagina with rubber cone and test-tube was in general use. The vagina is about 5 inches shorter than that in use here—in order to secure the entire ejaculate the aim is to have the bull deposit the semen in the rubber cone and not on the inner lining of the vagina.

The majority of centres have a teaser cow, but at four centres dummy cows were used. At one of these the artificial vagina is held against the dummy, but at the others it is fixed inside with the opening in the normal position and protruding through a moulded rubber apron. Each centre using the dummy has one or more bulls that will not respond to it. To collect from them a young bull (in a breeding crate) is used in place of a teaser cow. This is also done with success at centres using a teaser cow in the case of bulls that are slow or refuse, for a spell, to respond to the cow.

Treatment of Semen.—Immediately after collection the semen is mixed in an egg-yolk phosphate or egg-yolk citrate dilutor. (The former is in more common use, but some prefer the latter because for microscopic examination the spermatozoa can be seen more clearly.) The diluting medium is at 15° C. at the time of mixing—eggs or egg-yolk, usually stored in a refrigerator, have to be warmed before use. The tubes of diluted semen are placed in a beaker of water (15° C.) and put in a refrigerator to cool to the holding temperature of 5° C. The water-bath acts adequately as an insulator against cold-shock. For local use the tubes of semen are carried in thermos flasks containing small rubber balloons in which water has been frozen.

Insemination Methods.—The method of insemination almost universally practised is the glass tube into or through the cervix, the latter being held in position per rectum. Without apparently having any effect on conception rates, the semen is deposited at a variety of places in the uterus; practices at centres vary as follows: of each dose, 50 per cent. in each horn; or 25 per cent. in each horn and 50 per cent. in the body of the uterus; or 75 per cent. in the body of the uterus and 25 per cent. in the cervix as the inseminating tube is withdrawn. Although in every case the tube is inserted at least some length into the uterus there appears to be no record of any infection being caused.

Conception Rates.—The conception rate is the ultimate test of all A.I. operations and is of first importance. This may be stated as the number of inseminations required per conception or as the percentage of cows conceiving to a group of inseminations—first inseminations, first and second inseminations, and so on. The former method has been used in England and the latter in America. But neither calculation is as simple as it sounds; an early estimate of conception rate is required so that the efficiency of the inseminator and of each bull in use may be constantly checked. The problem is to decide on the shortest interval of time that should elapse before attempting to make a preliminary or comparative calculation.

Management of Bulls

Frequency of Collection.—The average frequency of collection is once every five to seven days. At centres with a large number of bulls the interval is the same for all bulls because of the routine which has to be maintained. Where there are fewer bulls the frequency is varied according to the fertility of each bull.

Individual differences in rate of semen production are found to be great. The authors saw some bulls—one eleven years old—from which collections had been made at least once per week and without a break for five years. Bulls which become incurably sterile are less common than those which have lapses for a period of months. Ascorbic acid treatment is apparently incapable of affecting cures in all such cases and a period of rest appears to be the only remedy.

The rate of semen production of which a bull is capable is clearly of the highest importance to a commercial society. In place of a few test ejaculates prior to purchase or hire there is everything to be said in favour of the practice of buying or hiring a bull subject to a month's trial of his fertility level. As to age and rate of semen production, bulls between three and five years old are most suitable for commercial centres; they have attained a maximum rate and have a useful life ahead of them.

Number of Cows per Bull.—With the higher rates of semen dilution now possible the only practical limits to the number of cows that can be inseminated from one bull are (1) the number of cows available for insemination, and (2) the number that may be arbitrarily fixed, *e.g.*, for a young untested bull. Societies may limit the latter to 300 to 400 cows, thereafter leasing the bull until his young stock are approved. One society owning eight bulls averaged 1,000 cows per bull in 1942. We saw one sire from which 1,200 cows were inseminated in 1942 and 970 in the first five months of 1943.

"Life" of Bulls.—Societies already well established financially prefer to write off their bulls over a period of three years. This is probably a safe figure in the case of a society with a high proportion of proved bulls which are six and a half to seven years old at the time of purchase.

"Life" tables have recently been published for 1,277 bulls that lived out their natural time in herds where normal matings were practised. They had an average of ten and three-quarter years at the last effective service. Other facts were: an eight-year-old bull stands a 50-50 chance of remaining useful for a further three and a half years; the chances that a seven-year-old bull will go out of use from natural causes in one year are one in nine, and for a 13-year-old bull the chances are even.

Exercise.—There was no evidence as to the optimum amount of exercise that bulls used for A.I. ought to receive. In spite of a great variety of routines and methods there seemed to be no measurable effect on service activity or semen production.

Feeding.—Feeding practice appears to be largely empirical—to date little critical research has been done on diet and semen production. At most centres the normal milk-production ration was fed. The ration at one centre where the bulls seemed to be in excellent condition was: 20 lb. best quality lucerne hay, 12 lb. grass silage made with whey, 10 lb. concentrates (16 per cent. protein) of mixture of bran, maize, crushed oats and linseed cake.

Housing.—At most centres the bulls were kept in pens of tubular steel-bar construction and on concrete floors. At one centre the bulls—16 in number—were chained by the neck in ordinary cow stalls and on a wooden floor. They were in excellent condition and were exercised for one hour each day.

Recent Technical Developments

Greater Dilution of Semen.—The authors discussed with Dr. G. Salisbury, of Cornell, the recently published results of his extremely thorough investigation on dilution rates (*J. Dairy Sci.* November, 1943. **26.** 1057-1069). Using yolk-citrate diluent he compared conception rates resulting from dilutions of 1 : 4, 1 : 6, 1 : 8, 1 : 10, 1 : 12, and 1 : 16. The bulls used (28 in number) were of average fertility, and the conditions were rigorous since all semen samples had to be sent by parcel post before being used for insemination. A summary of the results is as follows:—

Ratio of Semen to Diluent	No. of Services	No. of Conceptions	Conception Rate*
1 : 4	289	148	51·2
1 : 6	331	182	55·0
1 : 8	544	284	52·2
1 : 10	405	203	50·1
1 : 12	565	272	48·1
1 : 16	589	326	55·3

* Percentage of total first and second inseminations resulting in conception as judged by non-returns after an interval of five months.

At all rates of dilution 1 c.c. of the diluted semen was used for insemination. It is clear that dilution up to 1 : 16 gives results as satisfactory as the lower dilution rates. Semen at all dilution rates

as used for as long as six to eight days after collection. No observ-ble differences were noted in the maintenance of fertility for the veral dilution rates after the first four days of storage; the insemina-ons made with semen older than this were not numerous enough be analysed.

Dr. Salisbury is now experimenting with a dilution rate of 1 : 50. the case of semen from three bulls so far used the results are as tisfactory as those from the 1 : 16 rate. A much larger number of lls will be sampled before results are published.

An alternative method is to dilute less extensively and inseminate th a smaller and more concentrated dose. Burkhardt at Wisconsin lutes 1 : 6 and inseminates with $\frac{1}{8}$ to $\frac{1}{10}$ c.c. of diluted semen. His nception rates are very satisfactory.

It is clear that in England it will be possible to work with a rate of lution much higher than the typical one of 1 : 3. An important int is that the dilution rate should not be less than 1 : 3. This is e minimum for the proper buffering of the semen. An operator t aware of this fact expects that he will get better results with a : 1 or 1 : 2 dilution; this is not the case.

While dilution rates may safely be raised now, the authors conclude at there is need for further experiments on the following problems:) relation of density of spermatozoa to dilution rate; (2) relation tween dilution rate and volume inseminated, *e.g.*, high rate and edium dose *v.* low rate and small dose and the minimum number of rmatozoa required in each case; (3) the site of deposition of semen the uterine tract that will give the highest conception rate.

Blood-typing for Parentage Tests.—The work of Ferguson and win at the University of Wisconsin on the antigenic characters und in the red blood cells of cattle has made rapid strides in recent ars and is to-day the foundation of a "parentage test" which the ed societies readily accept and which, in connection with A.I. plied to pedigree cattle, they welcome. At least 30 different llular antigens have been isolated; each is inherited in a dominant nner and an individual animal may inherit but a few of them. cause of the very large number of possible combinations of these antigens two individuals exactly identical in antigenic make-up ve not been found except in the case of identical twins. The iversities and the breed societies are now prepared to go to law the findings of a parentage test.

Regulations and the Breed Societies.—There are no Federal or States s controlling the practice of A.I. in America. In conjunction th the American Dairy Science Association the Pure Bred Dairy ttle Association has drawn up rules and regulations governing I. in pure-bred dairy herds.

Personnel.—It would appear that in certain areas there is a tradition r engaging veterinary inseminators, while in others lay inseminators dominate. In general the veterinary colleges do not yet appear be producing men trained to undertake A.I. work, although the terinary schools of the University of Colorado and of Guelph, ntario, now include theory and practice in their teaching, largely cause of the numbers of their graduates who have taken up work this field.

Control of Disease.—An essential feature of the purchase or hire bulls is to ensure that they are free of diseases which might be nsmitted to cows bred artificially. The only important condition this group is *Trichomoniasis*. It is clear that it is still impossible make an accurate diagnosis of this disease in the bull, but the mbination of a negative result on examination of "sheath washings" d a herd history showing no evidence of infection among the cows n be accepted as evidence that the bull is not infected.

In Wisconsin there is a history of one bull used artificially having fected cows in several herds in the area. Because practically all cows in these herds were being inseminated no serious spread k place within herds. The condition was first suspected as a sult of the bull's service-conception ratio and the irregularity of returns to his services, and the disease was then diagnosed in his s. Treatment consisted only in resting the cows for two oestrous riods; the disease was quickly brought under control.

A.I. is regarded as one of the most potent weapons in the control *Trichomoniasis*, and there is evidence of its successful use in herds ere the disease had been established within the herd under normal eeding conditions.

The Future.—A.I. societies appear to be concentrating entirely long-term breeding policy. The pioneer stage in organisation is ind them and they know that research in technical developments being actively prosecuted. Bull-selection committees view their s as would a private pedigree breeder taking the long view in the erest of his own herd. The policy followed may vary with the ool of thought in the area, but it is consistent. For example, the mell organisation, greatly influenced by the proved-sire breeding gramme of the U.S.D.A. at Beltsville, Washington, selects its ls on progeny test alone and without reference to family relation-ps or lines of breeding. The Beltsville authorities maintain that constant progress can be made entirely by the use of proved sires and that the field of selection is much wider if such relationships are ignored. On the other hand, societies in Wisconsin and New Jersey prefer to develop line-breeding programmes. In this they are influenced by studies and experiments which have been carried out by breeding authorities in their States. The succession of bulls used may represent a degree of inbreeding similar to that practised by some private breeders of pedigree cattle or it may be even more severe.

Insemination of Other Livestock

There is no organised co-operative development of A.I. for farm animals other than dairy cattle. A few centres keep bulls of beef breeds, but there are no societies in which they are a major feature of the breeding programme. The U.S. Dept. of the Interior, Office of Indian Affairs, uses A.I. in its bull-breeding herd of Hereford cattle on its ranch in New Mexico.

Turkeys.—The only practical application of A.I. to poultry breeding concerns turkeys. Three commercial firms in California use it in the case of valuable stock birds which frequently become too heavy for normal mating. N. J. S.

ABSTRACTS

[Studies on the Survival of Johne's Bacilli. Lovell, R., Levi, M., and Francis, J. (1944.) *J. comp. Path.* **54**. 120-129.]

The difficulty in the control of Johne's disease is due in no small measure to the ability of Johne's bacilli to survive for long periods outside the animal body, and in order to obtain some knowledge concerning this property the authors planned three experiments.

In one experiment an emulsified saline suspension of a culture was added to bottles of sterilised distilled water, tap water and pond water containing mud. The bottles were kept at room temperature in a cupboard in the laboratory and tested at monthly intervals for nine months, a final test being made after 13 months. The results show that Johne's bacilli were recovered in culture after nine months but not after 13 months. There was no apparent difference between the survival times in the different kinds of water.

In the second experiment, intestinal scrapings from cases of Johne's disease were suspended in unsterilised river or ditch water and kept in the open air. In one experiment the organisms were recovered after 113 days' exposure, despite the fact that between the first and 30th day of exposure the water was frozen. In other experiments on the same lines the organisms were recovered after 135 days in one case and 163 days in another.

In the third experiment, very valuable information was obtained concerning the survival of Johne's bacilli in naturally infected faeces exposed to atmospheric variations. It was shown that Johne's bacilli remained viable for at least 246 days in faeces exposed in the open to the full effect of sunshine and rain. The faeces were sometimes fluid, sometimes frozen and at other times dried by the sun. Other experiments along the same lines gave survival times of 152 days, 208 days, 163 days, etc., depending on the conditions in which the faeces were kept. Johne's bacilli appear to survive longer under moist than dry conditions.

In view of these results the authors add that their observations give support to certain suggestions made in the control of Johne's disease. "It is not unreasonable, considering the longevity of the organism, to allow infective pasture to be regarded as unsafe for at least one year (Edwards, 1938). It is also a sound policy to encourage such methods of procedure as the breaking up of manure on infected pasture land, the disposal of manure from standings to cultivated land and the draining or fencing of ponds (Dunkin, 1929; Minett, 1933)." G. D.

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[Abattoir Depilation of Hogs. *J. Amer. vet. med. Ass.* (1944.) **104**. 262.]

An interesting process for the removal of hair from hogs is described which has replaced in the large packing plants the older method of removal by hand or scraping machinery.

Hogs after being hoisted to the rail and bled are dipped mechanically into a "hot adhesive compound" (the substance used is not described). This forms a seal-like coating over the whole carcase. Heat turns the cutaneous moisture into steam which loosens the hairs at the roots. The carcase is then taken out, cooled, and stripped of the compound. A completely dehaired hog is the result. To prevent the compound entering the nasal passages, a rubber band is placed around the nostrils or cotton-wool is used.

The process has apparently been in use since 1932.

Hog bristles are not, however, permitted to be destroyed and these are picked off by hand and are used in the manufacture of paint and shaving brushes and certain military equipment. F. L.

REVIEW

[The Pharmaceutical Pocket Book. (Fourteenth Edition, 1944.) The Pharmaceutical Press, 17, Bloomsbury Square, London, W.C.1. Price 10s.; postage 4d.; remittance with order.]

This publication contains a great deal of information that is of interest and value to veterinarians, including a veterinary posological table of seven columns covering horses, cattle, sheep, pigs, dogs, cats and fowls; detailed consideration of the Pharmacy and Poisons Act, 1930, the Pharmacy and Medicines Act, 1941, the Dangerous Drugs Acts, the Therapeutic Substances Act, 1925, and the Food and Drugs Act, 1938. An extensive table of solubilities is given, and other features are some 80 pages dealing with dispensing, chapters on abbreviations used in prescriptions, metric and imperial equivalents, hydrogen ion concentration, poisons and antidotes, and biochemical analysis, and notes on bacteriology.

NOTES AND NEWS

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events

Oct. 4th.—Meeting of the Ayrshire Division, N.V.M.A., at the Hannah Institute, 2.30 p.m.
Oct. 11th.—Meeting of the Editorial Committee, N.V.M.A., at 36, Gordon Square, W.C.1, 2.30 p.m.
Oct. 13th.—Meeting of the Dumfries and Galloway Division, N.V.M.A., at Dumfries (Station Hotel), 2 p.m.
Oct. 13th.—Meeting of the Mid-West Division, N.V.M.A., at Bristol (Royal Hotel), 2.30 p.m.
Oct. 16th.—R.C.V.S. Committee Meetings, 10, Red Lion Square, W.C.1.
Oct. 17th.—R.V.C.S. Committee and Council Meetings, 10, Red Lion Square, W.C.1.
Oct. 18th.—R.C.V.S. Quarterly Council Meeting, 10, Red Lion Square, W.C.1.
Oct. 18th.—Meeting of the Section of Comparative Medicine, Royal Society of Medicine, at the Society's House, 1, Wimpole Street, W.1, 2.0 for 2.15 p.m.
Oct. 19th and 20th.—N.V.M.A. Annual Meeting, Council Meetings and Demonstrations, in London.

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Roll of Honour

Member's Son "Presumed Killed."—We learn with deep regret that Sub-Lieut. Henry Graham Sumner (R.N.V.R.), eldest son of Mr. and Mrs. Henry Sumner, Springfield Cottage, Eaton Road, West Derby, Liverpool, 12, is reported missing. Sub-Lieut. Sumner was serving in H.M. Submarine "Trooper," his name and that of the vessel being given in the official casualty list published in *The Times* of September 15th.

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PERSONAL

Birth.—Hall.—On September 12th, 1944, at 35, Drumsheugh Gardens, Edinburgh, to Lucy, wife of R. F. Hall, M.R.C.V.S.—a son.

Marriages.—Harris—McCurdy.—On September 6th, 1944, at High Street Presbyterian Church, Ballymena, Co. Antrim, G. W. Harris, M.R.C.V.S., only son of Mr. and Mrs. S. Harris, "Thornfield," Ballymena, to Isabella, youngest daughter of Mr. and Mrs. S. McCurdy, Teeshan, Ballymena.

Prytherch—Brooks.—On August 16th, 1944, at Salem Methodist Chapel, Mediden, Flintshire, How Eirwyn Prytherch, M.R.C.V.S., eldest son of Mr. and Mrs. W. T. Prytherch, Bryngôf, Llanfair. P.G., Anglesey, to Kate Elizabeth Brooks, eldest daughter of Mr. and Mrs. T. Parry Brooks, Plas Newydd, Meliden, Flintshire.

Richards—Price.—On August 15th, 1944, at Llangyfelach Parish Church, Richard Alun Richards, B.V.Sc., M.R.C.V.S., second son of Mr. and Mrs. S. Richards, Gwernypwll, Caersws, Mont., to Ann Elonwy Price, B.A., only daughter of Mr. and Mrs. W. H. Price, Tan-y-lan, Morriston, Swansea.

Glasgow Veterinary College Appointments.—The following appointments to the senior teaching staff of the Glasgow Veterinary College are announced. That of Mrs. H. J. Smith is of particular interest, as being the first appointment of a woman as professor in a veterinary college.

Chemistry and Physics: Professor Joseph Knox, D.Sc.
Anatomy: Professor Mrs. H. J. Smith, M.R.C.V.S.
Medicine (from January 1st, 1945): Professor Donald Campbell, M.R.C.V.S.
Assistant: Professor Geo. Dykes, M.R.C.V.S.
Surgery (from January 1st, 1945): Professor Wm. Robb, F.R.C.V.S.
Assistant: Mr. A. H. F. Robb, M.R.C.V.S.

Southern Rhodesian Appointments.—In connection with the appointments announced in our issue of September 16th, the following information should be added that Captain Huston succeeded Mr. B. L. King, who retired from the post of Chief Veterinary Surgeon on May 16th, 1944, and that Captain Adamson takes the post vacated by Captain C. F. Johnston, who retired from the position of Assistant Chief Veterinary Surgeon on June 27th, 1944.

Veterinarians in the Far East.—Our readers will be relieved to learn that we have recently heard on reliable authority that both Captain J. Edgar, M.R.C.V.S., D.V.S.M., and Mr. D. L. McWhirter, B.Sc., M.R.C.V.S., of Shanghai, and at present interned there, are "well and in good heart."

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R.C.V.S. OBITUARY

Mower, George Thomas Summers, New Deer, Aberdeenshire. Graduated London, July 15th, 1910. Died December 11th, 1943. (Information received September 18th.)

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COLONIAL SERVICE RECRUITMENT

In an announcement on recruitment for the Colonial service after the war, issued recently, the Colonial Office stated:—

"The war has inevitably imposed a great strain upon the Colonial service: and the present shortage of staff in relation to the heavy responsibilities which the future will place upon the service makes the problem of post-war recruitment a matter of special moment.

"The existing cadres will, at the end of the war, be much below their pre-war strength. But it is already clear that the pre-war strength will be a good deal below that required for our future tasks. An extension in many directions will be urgently required in order to give effect to the widely conceived plans for social progress and material development with which it is proposed to press forward immediately circumstances permit.

"Under the schemes in prospect, it is hoped that the staffing difficulties will be relieved in future by the recruitment of Government servants from local communities in the colonies on a much wider scale than in the past. But it is clear that there will still be a wide field for the employment of externally recruited officers, and fresh recruitment of such officers will have to be undertaken as promptly as possible.

"It is accordingly the intention to make arrangements whereby after the defeat of Germany, candidates from the armed forces or from among those employed on other forms of war work can be considered for appointment to the various branches of the Colonial service, subject, of course, to the requirements of the military situation. Detailed information about the arrangements for post-war recruitment and the terms of service to be offered cannot be made available until His Majesty's Government have decided that the appropriate time has come, and the Colonial Office is, therefore, not at present in a position to answer enquiries on the subject."

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SALE OF INSEMINATED HERD

A remarkable feature of the sale of Mr. P. B. Grain's Shelford herd of British Friesians at West Green Farm, Barrington, Cambs, on October 3rd, is that the whole of the milking portion of the herd is in-calf, by artificial insemination, to Kingswood Homespun. This is the bull bought from Mr. Horace Hale by the Cambs and District Cattle Breeders' Society for use at the A.I. centre. Some of the younger calves in the sale are also by this bull.—*Farmer and Stock-Breeder.*

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U.S.A. BUREAU OF ANIMAL INDUSTRY

Completion of 60 Years of Livestock Service

The Bureau of Animal Industry, of the U.S. Department of Agriculture created on May 29th, 1884, by act of Congress, completed 60 years of scientific livestock service in May. "During that span of years," states *Veterinary Medicine*, "it has led the national attack on livestock diseases and conducted a wide range of scientific work to improve livestock and their products.

"Comparable data and estimates indicate that during that period losses from most of the serious infectious livestock diseases have been reduced two-thirds or more. In support of this measure of progress, Bureau officials cite the results of several extensive veterinary activities conducted in co-operation with the states and livestock owners:—

Contagious pleuro-pneumonia of cattle—eradicated completely.
Foot-and-mouth disease—seven outbreaks eradicated completely.
European fowl pest—one outbreak eradicated completely.
Tick (Texas) fever—eradication more than 99 per cent. complete.
Tuberculosis in cattle—reduced from a national average of 5 per cent. to 0·2 per cent., a decrease of 96 per cent.
Hog cholera—controllable by preventive serum treatment; losses reduced at least two-thirds.
Common scabies of cattle—practically eradicated.
Sheep scabies—losses reduced more than 90 per cent.
Glanders—practically eradicated.
Dourine—practically eradicated.

Other extensive veterinary services were the development of Federal meat inspection and exclusion of foreign infections.

"The Bureau's scientific studies of livestock breeding, feeding and management, conducted largely at experimental farms, have resulted in several new breeds and types of livestock and poultry, and in methods of getting more products for feed consumed. Typical of recent results are the popular Columbia breed of range sheep the Beltsville small-type turkey, the supplemental feeding of phosphates to range cattle in certain areas and new knowledge on the relationship between types and weights of hogs as well as their rates of gain.

"The Bureau's discoveries and services provide the basis for several hundred scientific papers a year, having wide distribution among research workers, livestock owners and the public. Most of the new findings have beneficial, practical applications."

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NATIONAL PONY STUD BOOK

Vol. 25 of the National Pony Stud Book has now been issued, containing the pedigrees of 615 ponies. As usual the book is divided into sections, which include Polo and Riding Ponies, young stock, and the various Mountain and Moorland breeds, *viz.*, Dales, Dartmoor, Exmoor, Fell, Highland, New Forest and Welsh ponies.

Non-members can obtain copies of this official publication at 7s. 6d. from the National Pony Society, 35, Wymond Street, Putney, London, S.W.15.

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STUD GOAT SCHEME, 1944-45

The object of the Scheme is to improve by means of breeding the standard of milch goats kept by smallholders, cottagers and other persons of similar position. The scheme will operate during the forthcoming breeding season from September 1st, 1944, until the end of February, 1945, and is administered by the British Goat Society under the approval of and with financial assistance from the Ministry of Agriculture and Fisheries.

The stud goats used must have been entered, or be eligible for entry, in the British Goat Society's Herd Book and must have been bred from milk-producing stock. Services under the scheme are limited to goats owned by cottagers, smallholders and other persons of a similar position and the fee charged for each service must not exceed 5s.

The Stud Goat List containing particulars of 182 goats at stud under the Scheme for the period 1944-45, together with the details of the objects and administration of the Scheme can be obtained post free from the Secretary, British Goat Society, The Cottage, Roydon, Diss, Norfolk.

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MINISTRY OF AGRICULTURE NEWS SERVICE

Bull's Remarkable Record.—At a demonstration and show of livestock and a Young Farmers' Stock Judging Competition held at Histon recently under the auspices of the Cambridgeshire and Isle of Ely War Agricultural Executive Committees and the Cambridge and Isle of Ely Agricultural Society, one of the most interesting exhibits, provided by Messrs. Chivers & Sons Ltd., consisted of a proved dairy Shorthorn sire, Deenewood Lord Oxford 12th, three representative daughters of this bull and one of the bull's sons. Details of the female progeny of this bull were displayed which indicated that in the case of his first ten daughters, whose records were available, the milk yield of the daughters during their first lactation had been raised on the average by no less than 1,061 lb. of milk and the butter fat content by 0·6 per cent. over the corresponding yields of their dams.

Cropping for Milk.—Mr. N. R. Culpan, Broadwood, Crag Vale, Mytholmroyd, Yorks, took first prize in the class for farms under 100 acres in the "Cropping for Milk Competition" organised by the West Riding War Agricultural Committee. This farm is situated 900 feet up in the Pennines and has about 70 acres of land, 32 acres of which are ploughable, the remainder being rough permanent pastures. There is a herd of 70 pedigree T.T. Attested Ayrshires that is self-contained and in addition to all the heifer calves several bull calves are brought up each year.

Cropping on the farm is mainly oats, peas and tares, kale, rye, Italian ryegrass and leys. Some of the oats, peas and tares are made into hay, the rest are converted into silage. Kale is generously manured and 100 tons of green fodder is expected from 3½ acres. Rye is cut green and fed direct as is the Italian ryegrass.

The feeding of these crops is a problem of as great importance as the feeding of the stock itself. The solution lies in the application to the land of large quantities of dung with generous dressings of lime forming the basis of manuring. All the straw for bedding is chopped to ensure full absorption of urine.

The cows receive 50 lb. of marrow stem kale daily from early October to Christmas. From then until the middle of May the maintenance ration plus part of the production ration consists of 30 lb. of silage, 40 lb. of roots and a little hay. Some seeds hay is bought and a fairly large quantity of oat straw that is fed with the kale to the dry stock. Mangolds are bought for feeding late in the season.

During May both rye and Italian ryegrass are cut and carted to the stock on the poor land, thus enabling the main pastures to get well into their stride before grazing begins. The permanent grass has a short flush season and directly the quality begins to fall the stock receive about 50 lb. per day of oat, pea and tare mixture, cut green and carted to them. The bulk of this mixture is undersown and a useful aftermath grazing comes on later.

Full-time cows on this farm have the high average yield of 1,100 gallons per annum.

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The Royal Show will be held next year if the war with Germany ends this autumn. It will take place at Lincoln, where it was to have been in 1940.

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal views of the writer only and must not be taken as expressing the opinion or having received the approval of the N.V.M.A.

Letters to the Editor should reach the Office not later than by the first post on Monday morning for insertion in following Saturday's issue.

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THE FUTURE OF THE PROFESSION

Sir,—We fully agree with Captain Hall-Patch that the immediate needs of the profession should be satisfied before looking too far ahead.

Agriculture is flourishing at the moment and this state is being reflected in the veterinary profession so that practitioners are now having considerable difficulty in obtaining assistants and are able to pay them good salaries. With the change over from war to peace, it is problematic as to whether agriculture will continue in its present prosperous state and the shortage of qualified veterinary surgeons might no longer be a reality.

What, then, are the prospects of the very large number of members who will be released from the Forces? Will they become quickly absorbed, or will they have to experience such conditions as were present in 1940-42 or, perhaps, even worse?

When these members have been placed in adequately remunerated employment, and only then, should we feel justified in planning the future requirements of the profession.

Yours faithfully,
K. M. Smith.
H. Williams Smith.

35, Upper Garth Road,
Bangor, Caerns.
September 20th, 1944.

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VETERINARY EDUCATION: THE LOVEDAY REPORT

Sir,—Now that this report is the main item of discussion at the meetings of the various divisions of the "National," I consider that if the majority approve in general of the recommendations it is most important to emphasise:—

(1) That unless certain conditions are observed veterinary education, *within* the universities, cannot be of such a high standard as at present.

(2) That the universities concerned must agree to:—

(*a*) Establish faculties of Veterinary Medicine, with chairs in the clinical subjects. The head of such a faculty, and the occupants of these chairs, to be members of our profession, with full voting powers in the Senate.

(*b*) The R.C.V.S. to examine in the clinical subjects.

If the universities refuse, and if we are to keep our existing one-portal system of entry, which I think very strongly we should, then, regrettable as it will be, the report must be rejected, and the Government asked to carry on as hitherto and to give the money to the existing veterinary schools.

Personally, I fail to see why an agreement on the lines suggested cannot be possible, when both sides freely admit that their one desire is to see an advancement of the interests of our profession, *as a whole*, and irrespective of the various branches in which members are serving.

Yours faithfully,

"Rothiemurchus," J. F. D. Tutt.
St. Cross, Winchester.
September 16th, 1944.

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Sir,—In your issue of September 16th there appears a letter from Professor George Dykes. The facts which he cites are not such as are readily accessible for verification and his conclusion is open to doubt in the light of the changing attitude towards academic examinations which has been evident in the field of education for some years. The following quotations appear to be authoritative, categorical and entirely inconsistent with Professor Dykes' expressed view.

"In the interest of the individual child and of the increased freedom and responsibility of the teaching profession change in the School Certificate Examination should be in the direction of making the examination entirely internal, that is to say, conducted by the teachers at the school on syllabuses and papers framed by themselves."

From the Report of the Committee of the Secondary School Examinations Council, p. 140; H.M.S.O., 1943.

". . . in our opinion it is fundamental that the examinations which a student has to pass to qualify for admission to the Medical Register should be subordinate to the system of training. In its regulations and conduct, the training must be the master, the system of examinations the servant."

"We are of the opinion that there is only one satisfactory way of ensuring that examinations are kept in the right relationship to the training and that is to make the examinations a medical student has to pass 'internal' examinations, reflecting in their requirements the aims and spirit of the training which the candidates have received. We use the term 'internal' in the usual academic sense, as an examination which is regulated by the university at which the student has been trained, and which is conducted by the student's own teachers in collaboration with 'external' examiners, who are appointed by the university but have not been associated with the student's training. The presence of the external examiners and the supervision exercisable by the General Medical Council should safeguard fully the public interest."

From the Report of Inter-Departmental Committee on Medical Schools, p. 208; H.M.S.O., 1944.

One-portal systems, centralisation of academic examinations, seem to stand condemned by the professionals in education. If we wish to retain our one-portal we must state the special circumstances in which we differ from other learned bodies.

Yours faithfully,

110, Reigate Road, Ewell, Surrey. H. T. Matthews.
September 20th, 1944.

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"THE INTRADERMAL TEST IN BOVINE TRICHOMONIASIS"

Sir,—On reading the report of Mr. Kerr's paper on "The Intradermal Test in Bovine Trichomoniasis" in your issue of August 19th, 1944, as a student, I was interested in the statement that cows positive to the agglutination test on calving down pass the immunity in a passive form to their offspring, possibly by way of the colostrum, and that "this is followed by the appearance of a positive skin reaction which may remain until the calf is between nine and 18 months old."

Since the reaction to the "Tricin" test is admittedly an allergic phenomenon we must keep in mind the difference between allergy (protozoal or otherwise) and immunity, *viz.*, that the former is based on a tissue sensitisation and although inheritable has never been proved passively transmissible, and that the latter is a serological phenomenon and is concerned with the production of discrete antibodies which can be passively transmitted.

Knowing this, therefore, Mr. Kerr's explanation that the infected dam passed on immunity to her offspring while acceptable from the serological point of view is not so acceptable from the allergic viewpoint, *i.e.*, as an explanation of a positive "Tricin" test in a calf, which he set out to explain.

There are, in the writer's opinion, only three possible explanations of this reaction in calves born of actively infected dams reacting positively to the agglutination test: (1) Anaphylaxis; (2) non-specific infestations leading to allergy; (3) pre-natal infestation leading to allergy.

That the phenomenon may be an anaphylactic one receives some support from the fact that anaphylaxis is undoubtedly transmissible passively whereas allergy is not. But the anaphylactic theory would require the presence of an anaphylactic dam, and besides, the rarity of naturally occurring anaphylaxis in the bovine and the absence of any violent reaction to "Tricin" simulating anaphylaxis in other animals would tend to discredit anaphylaxis as an explanation.

Since anaphylaxis is ruled out, attention can be given to allergy as an explanation. Leaving aside the question of heredity, this demands that the calf be in contact with a sensitising allergen either non-specific or specific. First dealing with non-specific infestation; this question was raised by speakers to Mr. Kerr's paper, but the common commensal of the bovine alimentary tract *Trichomonas ruminantium* was not reported as being mentioned. It is quite possible that many positive skin reactions, particularly those that are unconfirmed by direct and serological examinations, could be due to *T. ruminantium* infestations, and it is interesting to note that of 50 abattoir cows found by Mr. Kerr to be skin positive, 26 could not be confirmed by other means. It was stated that these 26 cows reacted positively to "Tricin" as a result of a previous *T. foetus* infestation, but has *T. ruminantium* as a non-specific allergen been discounted?

The third explanation, that a pre-natal infestation might result in an allergic state being built up, seems quite feasible. Since *T. foetus* has been isolated from most of the viscera of aborted foetuses it is possible that the protozoon could also be present in lesser numbers in a calf carried to full term. The presence of the organism in the calf before parturition would be sufficient to set up an allergic sensitisation which would become evident in a positive "Tricin" test after birth. The scanty distribution of *T. foetus* in the calf, aided by the self-limiting nature of trichomoniasis, would tend to make isolation of the organism difficult. The fact that this allergy remains until the calf attains nine or 18 months would not support Mr. Kerr's contention that the allergy is "transmitted passively" by transference of antibodies in the colostrum.

Yours faithfully,

"Sunnymeade" Brendan Thomas Farrelly.
22 Zion Road, Rathgar, Dublin.
September 2nd, 1944.

DISEASES OF ANIMALS ACTS, 1894 TO 1937, AND AGRICULTURE ACT, 1937 (PART IV).

Summary of Returns of Confirmed Outbreaks of Scheduled (Notifiable) Diseases

Period	Anthrax	Foot-and-mouth	Parasitic Mange*	Sheep Scab	Swine Fever
Aug. 16th to 31st, 1944 ...	4	18	—	5	117
Corresponding period in—					
1943 ...	9	—	—	5	24
1942 ...	16	144	—	5	18
1941 ...	7	—	1	2	29
Total Jan. 1st to Aug. 31, 1944	127	63	6	67	724
Corresponding period in—					
1943 ...	197	12	6	110	357
1942 ...	226	347	26	123	298
1941 ...	309	258	15	144	910

NOTE.—The figures for the current year are approximate only.
* Excluding outbreaks in Army Horses.

Tuberculosis (Attested Herds) Schemes

The number of Attested Herds, *i.e.*, herds officially certified as free from Tuberculosis as at August 31st, 1944, was as follows:—

England	Wales	Scotland	Total (Great Britain)
4,189	8,545	3,831	16,565